U.S. Army
Corps of Engineers
New England District
Concord, Massachusetts

U.S. Environmental
Protection Agency
New England Region
Boston, Massachusetts

2007 Post-Remediation
Aquatic Community Assessment
1 ½ Mile Removal Reach
Environmental Remediation Contract
GE/Housatonic River Project
Pittsfield, Massachusetts

DCN: GE-122807-ADSL

December 2007

Contract No. DACW33-00-D-0006

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LIST OF ACRONYMS

cm	centimeters
EPT	Ephemeroptera, Plecoptera, and Trichoptera
ft	feet
GE	General Electric
GERG	Geochemical & Environmental Research Group
mm	millimeters
MS/MSD	matrix spike/matrix spike duplicate
NA	non-attainment
PCB	polychlorinated biphenyl
TL	total length
tPCBs	total PCBs

1. INTRODUCTION

A Post-Remediation Aquatic Community Assessment of the 1½-Mile Reach of the Housatonic River was conducted in the summer of 2007. The 1½-Mile Reach represents a section of the East Branch of the Housatonic River between Lyman Street Bridge and the confluence of the East and West Branches of the Housatonic River. The two aquatic communities that were evaluated were fish and benthic macroinvertebrates. Benthic macroinvertebrate sampling and surveys were completed in similar areas in 2000. Three transects were sampled for this study: T-170, T-134, and T-070 (Appendix A). This report compares recent survey macroinvertebrate results to baseline data collected in July 2000. This report also summarizes the results of the 2007 fish survey. The assessment was performed in accordance with the June 2007 Aquatic Invertebrate and Fish Sampling Work Plan. All work associated with this sampling effort was conducted from 25 June through 27 June 2007.

2. OBJECTIVES

The objectives of the sampling and the surveys were the following: 1) measure polychlorinated biphenyl (PCB) tissue concentrations in benthic macroinvertebrates; 2) evaluate the diversity and abundance of benthic macroinvertebrates; and 3) to characterize the fish species present and their relative abundance following the completion of remediation. The macroinvertebrate community characterization survey results and the PCB tissue results were compared to the pre-remediation data collected in 2000.

3. BIOLOGICAL CHARACTERIZATION

Biological communities reflect overall ecological integrity by integrating physical, chemical, and biological habitat conditions. Thus, the evaluation of these communities can provide diagnostic indicators of river health. Two biological communities, benthic macroinvertebrates and fish, were characterized for this assessment.

Benthic macroinvertebrates are aquatic organisms that live primarily along the bottoms of water bodies and can be seen without magnification; the most common benthic macroinvertebrates in freshwater systems are typically aquatic insects. Diverse taxonomic groups of insects are represented, including commonly the early life stages (larvae and/or pupae) of mayflies (Ephemeroptera), stoneflies (Plecoptera), and caddisflies (Tricoptera). Insects are represented in a number of general functional groups (collectors, predators, scrapers, and shredders) and are particularly important in processing and breaking down organic material. They also serve as a primary food source for many fish species

Benthic macroinvertebrates are good indicators of localized habitat conditions because they spend a majority of their aquatic life cycle in a limited area. Macroinvertebrate assemblages are made up of species that constitute a broad range of trophic levels and habitat tolerances, thus, the relative abundance of different macroinvertebrate taxa can provide an indication of overall river ecosystem health. One commonly used indicator of ecosystem health is the EPT Index, the total number of distinct taxa within the insect orders Ephemeroptera (E), Plecoptera (P), and Trichoptera (T). This index summarizes taxa richness within the groups of aquatic insects that generally are considered pollution sensitive. Characterizing these assemblages can be used during long-term monitoring to assess the success of restoration efforts.

The presence and relative abundance of fish species in an area can also be used to estimate the suitability of localized conditions because it is assumed that a species will only be present if desirable habitat characteristics are present. Habitat restoration activities following remediation in the Reach included the re-establishment of runs, riffles, and pools and the installation of boulders and wing deflectors, which act to increase habitat diversity under low-flow conditions and provide cover. Characterizing fish usage of the Reach can also be used to assess the success of restoration efforts.

4. METHODOLOGY

4.1 BENTHIC MACROINVERTEBRATES

Benthic macroinvertebrate samples were collected from three locations previously sampled in 2000 (Appendix A) during low-flow conditions to characterize the post-remediation re-establishment of communities and to obtain samples for analysis of tissue PCB concentrations. Sampling locations reflected, to the extent possible, typical conditions in each of the three areas based on substrate, riparian cover, and channel width, depth, and velocity.

At each location, 12 samples were collected using a 9 by 18-inch rectangular dip net with a 500-micron (0.5-millimeter [mm]) mesh. The 12 sample locations for each transect were equally spaced (approximately 2 feet [ft] apart) and traversed the riffle width in an upstream zigzag pattern. A 1-meter square grid was deployed upstream of the net to define the sampling area at each sample location. At location T-070, which was characterized by loose, sandy substratum, the sediment within the 1-meter grid was “kicked” by one individual for 2 minutes. The benthic invertebrates and other material dislodged thereby were carried downstream into the sampling net. Due to the armored, cobble and boulder substratum at locations T-170 and T-134, the bed was picked and scrubbed by hand for 2 minutes by three individuals during each sample collection. All samples were preserved in 0.5-liter plastic containers with 95% denatured ethanol in the field, and then delivered to Lotic, Inc. (Unity, Maine) for taxonomic identification and enumeration.

At each of these transects, an approximate 10-gram benthic macroinvertebrate tissue sample was collected by hand from rocks and other in-stream structures in the immediate vicinity of the bottom-sampling locations using chemically decontaminated forceps. These tissue collections focused on the larger and more numerically dominant benthic organisms in order to provide sufficient biomass to satisfy laboratory requirements for the analysis. Samples were placed in pre-cleaned 4-ounce glass jars with river water during collection and then placed on wet ice for return to the laboratory. In the laboratory, samples were drained, weighed, and preserved by freezing at approximately 0°F. Samples were then shipped frozen to the Geochemical & Environmental Research Group (GERG) at the College of Geosciences Texas A&M University for PCB tissue analyses. The sample from Transect T-134 was collected in triple volume to be analyzed in duplicate and matrix spike/matrix spike duplicate (MS/MSD).

4.2 SAMPLE RECEIPT AND PROCESSING

The 36 benthic macroinvertebrate samples were shipped to Lotic, Inc. In the laboratory, the samples were re-sieved through a standard #40 sieve (mesh opening of 0.425 mm) and completely sorted using a stereomicroscope at 6-15X magnification. All specimens were identified to the lowest practical identification level, generally genus, or to species level when possible. Some damaged or immature specimens were identified to the family level. Organisms were identified using the most current taxonomic references. Chironomids were mounted onto microscope slides in CMCP-9 mounting medium; oligochaetes were mounted in polyvinyl lactophenol. Both groups were then identified using a compound microscope. The three benthic macroinvertebrate tissue samples were shipped to GERG. The sample from Transect T-134 was collected in triple volume. In the lab the sample was homogenized and extracted in three separate aliquots. One aliquot was analyzed as a parent sample, one as a duplicate and one as a MS/MSD.

4.3 FISH

Fish surveys were conducted by backpack electroshocker. Three 600-foot reaches of river were surveyed. Surveyed reaches were located at transects where benthic macroinvertebrates were collected previously (T-070, T-134, and T-170); however, each location was extended 300 ft upstream and downstream of each transect marker. Each location was electroshocked in a zigzag pattern from bank to bank, in an upstream direction. In addition, areas identified as suitable fish habitat (e.g., pools, riffles, and runs) were shocked more intensively. One staff member operated the electroshocker while two staff netted fish. Staff netted fish behind the person shocking to better capture stunned fish floating downstream. Fish were then identified and total length (TL) was measured in centimeters (cm) before being returned, unharmed, to the river near their point of capture. All instrumentation and sampling gear was decontaminated prior to sample collection with a de-ionized water rinse.

5. RESULTS AND DISCUSSION

5.1 BENTHIC MACROINVERTEBRATE COMMUNITY CHARACTERIZATION

Data from location T-134 collected in 2007 were very similar to results from the 2000 sampling, with a slight increase in taxa richness and moderate increases in EPT richness and percent dominance. The percent dominance (percent of the total faunal abundance attributable to the single dominant taxon – generally, a lower number indicates higher diversity and is considered "better") increased to 23.5%, which, although an increase from 2000, was similar to the percent dominance at T-70 and T-170 in 2007.

Location T-170 showed dramatic improvements in community structure from 2000 to 2007. The dominant organism had shifted from the tolerant Oligochaete (*Limnodrilus)* to the slightly less tolerant caddisfly (*Hydropsyche).*

The results from the 2007 sampling at location T-070 indicated a more dramatic recovery than either of the other sample areas. Table 1 summarizes the changes in key metrics between 2000 and 2007. A detailed summary of the 2007 community characterization data is provided in Appendix B.

Given the lack of a suitable reference site, it is difficult to use many of the metrics in the Environmental Protection Agency Rapid Bioassessment Protocol manual (Barbour et al., 1999), which uses comparisons with a reference condition to make evaluations of benthic macroinvertebrate communities. Lotic, Inc., however, has been using an in-house model, which is based on 12 years of benthic community data, to evaluate community conditions. Lotic Inc.'s model is designed to correspond with the Maine Department of Environmental Protection linear discriminant model (Davies et al., 1999). The Lotic, Inc. model assigns the following classifications based on benthic community structure:

- **Class A**: High quality water; aquatic life as naturally occurs.
- **Class B**: Good quality; no detrimental changes to the biological community.
- **Class C**: Lowest quality, some changes to aquatic life; maintains the structure and function of the resident biological community.
- **Non-attainment (NA)**: Does not attain Class A, B, or C standards.

Table 1

Comparison of Taxa Measures (Per m^2) Between 2000 and 2007 Samples. Capital Letters indicate Estimated Water Classification based on the Lotic, Inc. Model

Location	Taxa Richness	Abundance	EPT Richness	Dominant Organism	Chironomidae Richness
T-134 2000	75 B	3300	17 A/B	*Hydropsyche* 9.3% A/B	30
T-134 2007	78 B	3584	25 A/B	*Microtendipes pedellus grp.* 23.5% B	29
Change	**+3 (4.0%)**	**+284 (8.6%)**	**+8 (47.0%)**	**+14.2%**	**-1 (3.4%)**
T-170 2000	31 B	401	6 NA	*Limnodrilus* 41.6% NA	13
T-170 2007	63 B	5419	19 B	*Hydropsyche* 21.2% B	28
Change	**+32 (103.2%)**	**+5018 (1251.4%)**	**+13 (216.7%)**	**-20.4%**	**+15 (115.4%)**
T-070 2000	18 NA	978	2 NA	*Limnodrilus* 91.7% NA	11
T-070 2007	82 B	3869	20 B	*Limnodrilus* 19.5% B/C	30
Change	**+64 (355.6%)**	**+2891 (295.6%)**	**+18 (900.0%)**	**-72.2%**	**+19 (172.7%)**

Notes:

m^2 = square meter

5.2 BENTHIC MACROINVERTEBRATES - PCB TISSUE RESULTS

In 2000, only location T-134 was sampled for PCB tissue analysis. The other two locations T-70 and T-170 did not contain sufficient mass of invertebrate tissue for PCB analysis. Because only location T-134 was sampled in both 2000 and 2007, all discussion of comparative PCB concentrations between pre- and post-remediation samples refers to samples from this location.

Total Polychlorinated Biphenyls

Analytical results for total PCBs (tPCBs) are shown in Table 2. A number of important observations can be made from these results. A substantial decrease in tissue PCB concentrations, a reduction of more than 99% between the 2000 and 2007 collections, is evident and indicates the effects of the remediation, which was also reflected in the sediment PCB concentrations. The low tPCB concentrations in 2007 were consistent at all three locations sampled, and in both replicate analyses from location T-134. Tissue percent lipid concentrations were generally equivalent in both the 2000 and 2007 samplings and at all three locations sampled in 2007, so this decrease is reflected in the lipid-normalized concentrations as well.

Table 2

Analytical Results for tPCB, Percent Lipid, and Lipid-Normalized tPCB for 1½-Mile Reach Benthic Invertebrate Sampling, 2000 and 2007

	2000		2007			
	T-134	**T-134 (dup)**	**T-070**	**T-134**	**T-134 (dup)**	**T-170**
tPCB (mg/kg)	485.1	187.6	1.06	1.56	1.70	0.71
Percent Lipid	1.7	2.7	1.5	2.4	2.4	1.1
tPCB (mg/kg/Lipid)	28535.3	6948.1	70.7	65.0	70.8	64.5

Notes:

tPCB used in table 2 based on the Congener analysis

mg/kg = milligrams per kilogram

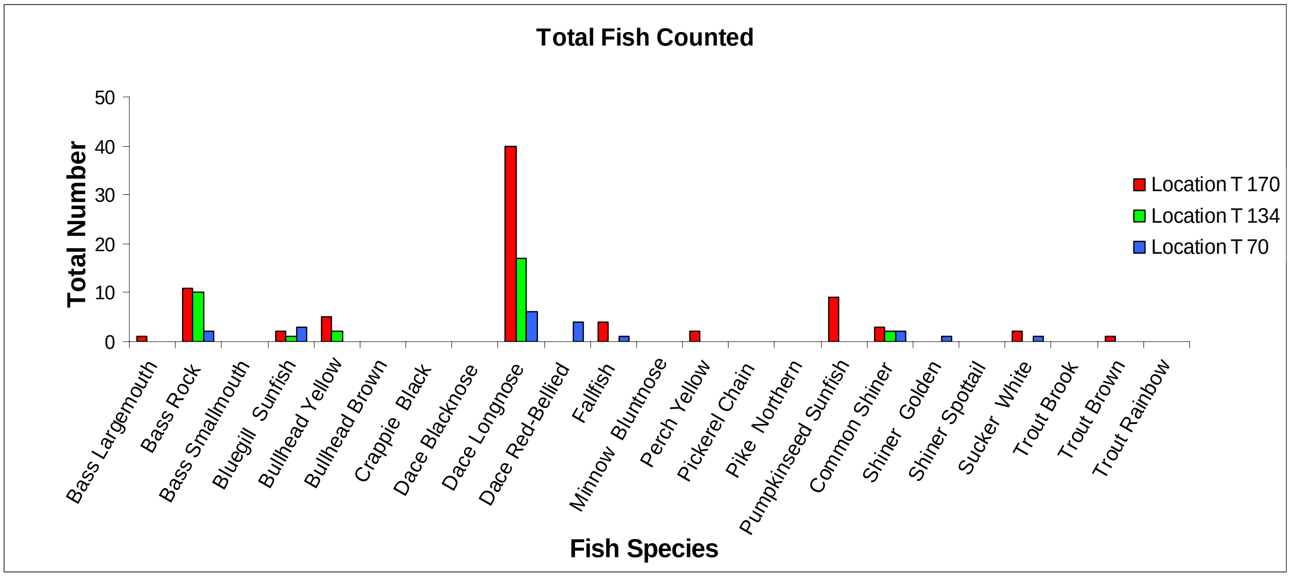
Complete analytical results for the PCB congener analysis, as well as percent lipids are presented in Appendices C (2000) and D (2007). Also included are results for total PCBs, Aroclors, and level-of-chlorination PCB homologues; these latter parameters were summed by the analytical laboratory from the appropriate individual congener results.

5.3 FISH

Of fish species surveyed from all reaches, longnose dace (*Rhinichthys cataractae*) were most abundant (Figure 1), particularly at location T-170 (Appendix A). Rock bass (*Ambloplites rupestris*) were moderately abundant at T-170 and T-134, while pumpkinseed sunfish (*Lepomis gibbosus*) were the only other abundant fish at T-170. Location T-170 had the highest total number of fish (80) and the highest diversity of fish species (11 species). This reach included expansive riffle and pool sections, which are utilized by fish in the Cyprinidae and Centrarchidae families. Location T-134 had low species diversity, despite having the best habitat consisting of deeper water, consistent flow, sheltered pools, and large in-stream boulders. Location T-070 had the lowest total number of fish (20) and low species diversity (8 species). Habitat within this reach consisted of shallow, warm water, sandy substrate with one riffle section. Consequently, more heat-tolerant fish species were found in this section of river.

Figure 1

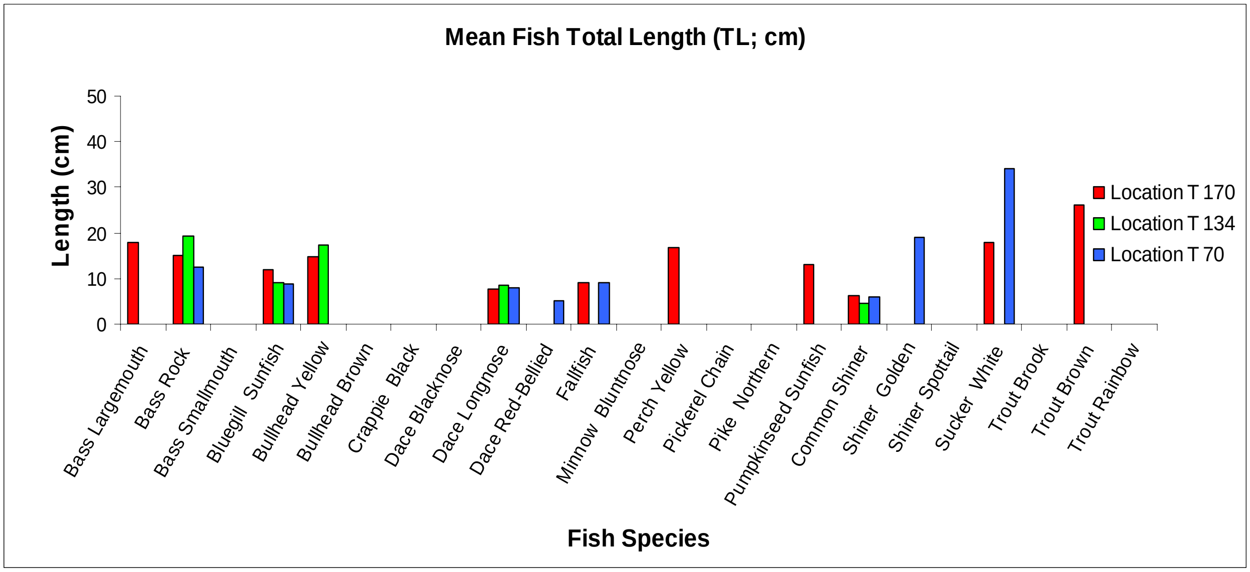
Total Fish Surveyed from Locations T-170, T-134, and T-070 in the 1½ Mile Reach of the Housatonic River, Pittsfield, Massachusetts, June 2007



Mean total length of all fish species surveyed was also recorded (Figure 2). Based on measured lengths, one 1-year-old largemouth bass (*Micropterus salmoides*) and one 3-year-old brown trout (*Salmo trutta*) were identified. The majority of cyprinids, rock bass, and sunfish species surveyed were identified as adult stages.

Figure 2

Mean Total Fish Length (TL; cm) of All Species Surveyed at Locations T-170, T-134, and T-070 in the 1½ Mile Reach of the Housatonic River, Pittsfield, Massachusetts, June 2007



6. DISCUSSION

Pollution tolerance differs among invertebrate taxa. The EPT Index is an effective and readily understood tool to evaluate aquatic health; mayflies (E), stoneflies (P), and caddisflies (T) are extremely sensitive to changes in water quality. Their presence indicates a high quality of water, while their absence suggests water may be polluted. High-quality streams usually also have the greatest species richness. Many aquatic insect species are intolerant of pollutants and will not be found in contaminated waters. The greater the pollution, the lower the species richness expected.

Based on taxa and EPT richness at location T-134, water quality conditions are good to high relative to the same location in 2000. The increases in overall taxa richness and EPT richness at location T-170 would seem to indicate fair/good habitat and water quality. The large increase in EPT and overall richness at location T-070, combined with the dramatic reduction in dominance of *Limnodrilus*, indicate good water/habitat quality.

Fish species that have been documented previously in the Housatonic River that were not surveyed in this 2007 study included chain pickerel (*Esox niger*), northern pike (*Esox lucius*), brook trout (*Salvelinus fontinalis*), and rainbow trout (*Oncorhyncus mykiss*). These fish were all documented downstream in habitat that is not found in this reach of river, therefore, their absence in 2007 was expected. Water temperature was recorded by a data-logger at the Pomeroy

Avenue Bridge (Station 08), which is located slightly downstream of location T-170. Average water temperature during the survey period (June 25-27, 2007) was 21.1ºC, which was near or exceeded the maximum preferred temperature of brook trout, rainbow trout, and chain pickerel.

Critical life history variables for fish (and all aquatic organisms) are regulated by temperature (Hauer and Lamberti, 1996). Most freshwater fish can tolerate a relatively wide range of temperatures, although each species prefers a specific range within which growth, reproduction, and survival are optimized. Some species, such as brook trout, exhibit a more rigid requirement in regard to upper and lower temperature thresholds, requiring a year-round supply of cold, oxygenated water for survival. Others, such as white sucker (*Catostomus commersoni*), are adaptable to a much wider range of temperatures. The average daily water temperature during the survey was likely to have inhibited heat-intolerant species from utilizing the surveyed portions of the Housatonic River. Fish diversity may increase some in the future as woody debris and aquatic vegetation become more prevalent. The abundance and diversity of fish species identified appears to indicate good water and habitat quality.

7. REFERENCES

Barbour, M.T., J. Gerritsen, B.D. Snyder, and J.B. Stribling. 1999. Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates and Fish, Second Edition. EPA 841-B-99-002. U.S. Environmental Protection Agency; Office of Water; Washington, D.C.

Davies, S.P. and L. Tsomides. 1997. Methods for Biological Sampling and Analysis of Maines Inland Waters. Maine Department of Environmental Protection. DEP-LW107-A97.

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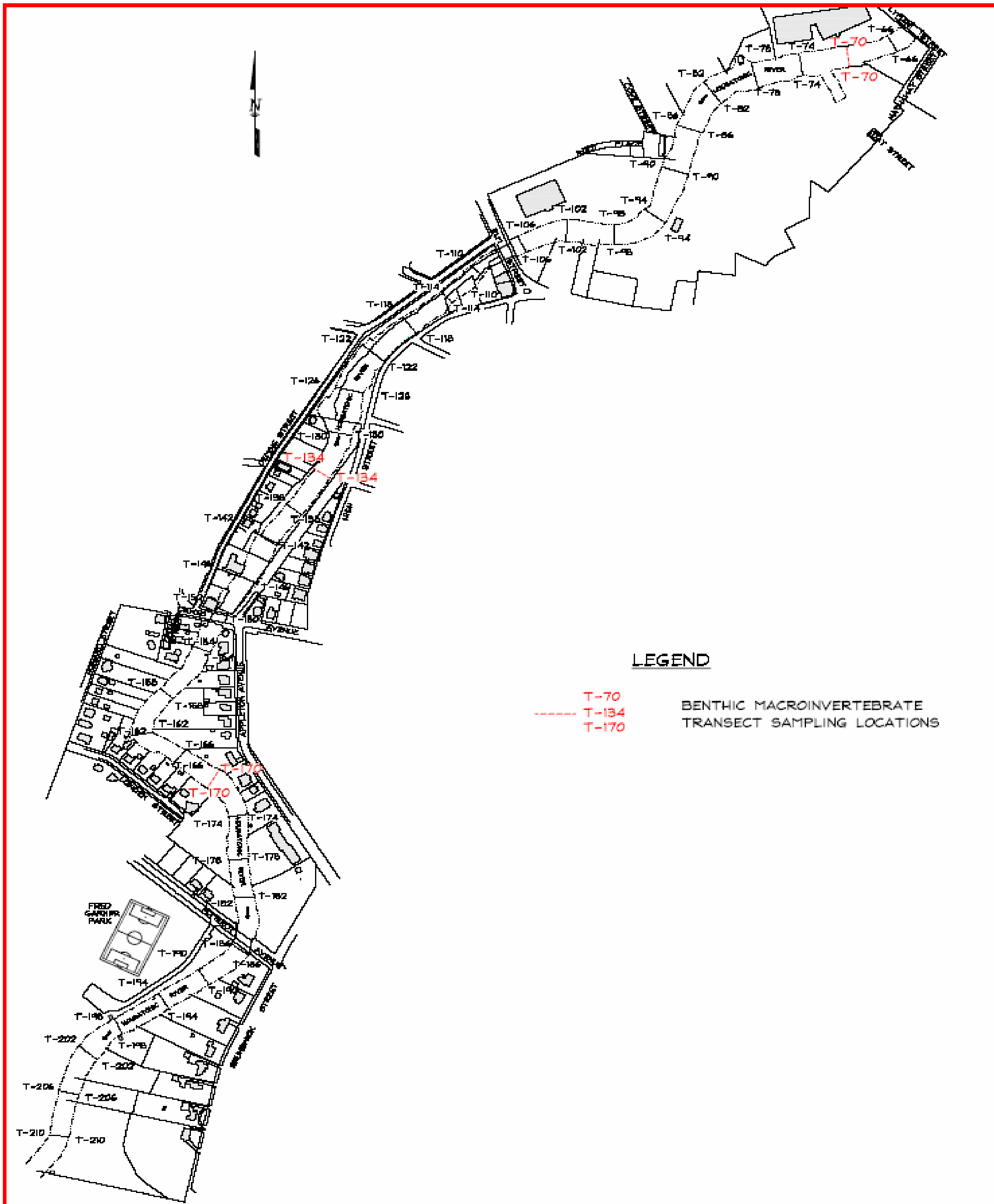
APPENDIX A

BENTHIC MACROINVERTEBRATE AND FISH SAMPLING LOCATIONS IN THE 1½-MILE REACH OF THE HOUSATONIC RIVER



WESTON SOLUTIONS, INC.
10 LYMAN STREET
PITTSFIELD, MA

PROJECT DESCRIPTION	DRAWING TITLE
EAST BRANCH HOUSATONIC RIVER	BENTHIC MACROINVERTEBRATE SAMPLING LOCATIONS

REV.	DESCRIPTION	DR'N	CK'D.	DATE
A	ISSUED FOR COMMENT	JR		8-19-07

0 400 800

DRAWN BY	JR
DATE DRAWN	8-19-07
SCALE	1"=400'
APP'D BY	

CAD DOCE: TRANSECT66SK3.DWG

DRAWING NUMBER: SRV-758-SK3

REV.: A

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APPENDIX B

BENTHIC MACROINVERTEBRATE COMMUNITY CHARACTERIZATION DATA (2007)

2007 Post-Remmediation Aquatic Assesment Monitoring
Macroinvertabrate Community Characterization
GE/Housatonic River Project
Pittsfield, Massachusetts

Sampling Location T-70													
Organism Description	Sample location along Transect												
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**Total**
Ablabesmyia	8	4					1						**13**
Acricotopus nitidellus	2												**2**
Ancylidae		5	1	2			5	2		1			**16**
Ancyronyx						1							**1**
Antocha	15	47	4		3	7	13	13	1		5		**108**
Baetis flavistriga	1	12	2		1		1	1	1	1	2		**22**
Boyeria					1								**1**
Boyeria vinosa							1						**1**
Brillia											1		**1**
Caenis		1					1						**2**
Cambaridae	2												**2**
Centroptilum	2					3							**5**
Centroptilum semirufum			14	2									**16**
Ceraclea				1	1	1	1						**4**
Cheumatopsyche	21	47	4		2	5	6	5	2		13		**105**
Chironomus	298	52	128	196	3	9	4	1	3	1	2		**697**
Cladotanytarsus	6	4		4			1			2			**17**
Corixidae					1								**1**
Cricotopus	2	16	4	4		1		1	1	1			**30**
Cricotopus bicinctus		3	4	4	4	7			3	1			**26**
Cricotopus trifascia	2						1						**3**
Cryptochironomus	20		4	12				1				1	**38**
Cryptotendipes	2												**2**
Derallus					1								**3**
Dicranopselaphus		1											**1**
Dicrotendipes	4	20	16	16	4	14	24	9	1		2		**110**
Dubiraphia	1		3	3	1	2	1						**11**
Endochironomus				16									**16**
Ephemera			2		1		1						**4**
Eurylophella		1	1		1								**3**
Gomphidae							2						**2**
Gyraulus												1	**1**
Hemerodromia							1			1			**2**
Heterocloeon							1						**1**
Hydrobiidae												1	**1**
Hydropsyche	8	10				1	2	4	1	6	11		**43**
Hydropsychidae	7	42		1						3	5		**58**
Hydroptila					1		2						**3**
Hydroptilidae							1	1					**2**
Isonychia						1							**1**
Larsia								1					**1**
Lebertia	2	2											**4**
Leptoceridae				1									**1**
Limnodrilus	84	78	165	350	4	20	3	12	12	22	3	1	**754**
Limnodrilus cervix	28		70	40	1	10		11		2	1		**163**
Limnodrilus hoffmeisteri	14	30	14	160		5	1	5	10	7	2	1	**249**
Limnodrilus udekemianus										3			**3**
Lymnaeidae												2	**2**
Maccaffertium			5	1	7	13	10	13	1		1		**51**
Maccaffertium modestum			2	1		6	4						**13**
Maccaffertium pulchellum						4	2						**6**
Macronychus				1	1		4	3			1		**10**
Microtendipes pedellus-grp.	180	74	28	4	1	1	4	9	1	18	10	8	**338**
Naididae							1	1					**2**
Nais	4	12				2	1	6			8		**33**
Nanocladius	4	4	4			2							**14**
Nectopsyche									1				**1**
Nematoda	1												**1**

Sampling Location T-70													
Organism Description	Sample location along Transect												
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**Total**
Nigronia							1						**1**
Ophiogomphus	1			1									**2**
Optioservus		2		3			1			3	2	1	**12**
Orconectes		6	25	6				1					**38**
Orthocladius	32		4		2	3	3				5		**49**
Orthocladius lignicola											1		**1**
Paracladopelma									6	9			**15**
Parametriocnemus											1		**1**
Paratanytarsus	16	8	8		2		4	1					**39**
Paratendipes	2	4	20	28	2	7	3	1	1	1	1		**70**
Procladius			4		1								**5**
Peltodytes	1			1		1			1				**4**
Phaenopsectra		8	16	4	1		4		6	7	7	12	**65**
Physidae										1			**1**
Plauditus	8		1	2	2		1	1	1			2	**18**
Plauditus gloveri		16	3							6	7		**32**
Plauditus punctiventris	7	8								2	3		**20**
Polypedilum	6			8	2					3	1	1	**21**
Potthastia		4											**4**
Procloeon	1	1											**2**
Procloeon rivulare		3	8	1					2		2		**16**
Psectrocladius	8	4					1						**13**
Psephenus								1					**1**
Pseudochironomus	2							2					**4**
Pseudosmittia	2												**2**
Psychomyia	1		2		1			2			1		**7**
Rheotanytarsus						2		1	1		1		**5**
Sialis				1			1						**2**
Simulium										1			**1**
Sphaerium										1			**1**
Stenacron			2			4	4	4					**14**
Stenelmis	2	1				2				5	1		**11**
Stylogomphus					1	0							**0**
Tanytarsus	36	16	12	8	4	4	5	3		1	2	1	**92**
Thienemanniella						1	3						**4**
Thienemannimyia/Arctopelopia group	50	12	12				2		1				**77**
Trichocorixa	6												**6**
Tricorythodes	13	10	20	15	1	1	3	3	2	4	1	1	**74**
Tubificidae	28	6	14	60		2	3		6				**119**
Abundance	**940**	**574**	**626**	**957**	**58**	**142**	**139**	**119**	**65**	**113**	**103**	**33**	**3869**

2007 Post-Remmediation Aquatic Assesment Monitoring
Macroinvertabrate Community Characterization
GE/Housatonic River Project
Pittsfield, Massachusetts

Sampling Location T-134													
Organism Description	Sample location along Transect												
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**Total**
Ablabesmyia									**2**				**2**
Ancylidae	1	2	3			1		3	3		1	1	**15**
Ancyronyx		1							1				**2**
Anthopotamus	1												**1**
Antocha	13	25	37	50	29	24	10	13	26	11	19	24	**281**
Baetidae			1					1					**2**
Baetis flavistriga	1	2	7	7	6	3		1	4	3	1	5	**40**
Caenis			1		1								**2**
Cambaridae	14	9	13	9	3	1	1	3	5	3	2	2	**65**
Centroptilum semirufum		1											**1**
Ceraclea		1							2				**3**
Cheumatopsyche	18	30	33	28	22	21	10	27	37	17	8	11	**262**
Chironomus												2	**2**
Cladotanytarsus	4	4	16	6		2	1		3		3	2	**41**
Crangonyx												1	**1**
Cricotopus	4			4	2		2						**12**
Cricotopus bicinctus		4	2	6		2					1		**15**
Cryptochironomus	2	6	2		2		1	1	1			2	**17**
Dicrotendipes	10	16	12	14	8	2	3		4	11	3	16	**99**
Dubiraphia	1	1	1							1	1		**5**
Elmidae	2	1											**3**
Endochironomus			2										**2**
Ephemera										1			**1**
Eurylophella		1		4		1		1			3		**10**
Gomphus		1								1			**2**
Hydatophylax									1				**1**
Hydropsyche	52	68	83	137	71	72	28	74	48		38	37	**708**
Hydropsychidae	5	10	8	5	8	5	2	3		53	2	4	**105**
Hydroptila										4			**4**
Lebertia	1		1	1					2				**5**
Limnodrilus	1		3	4				1					**9**
Limnodrilus hoffmeisteri			3	1		2			1				**7**
Limnodrilus udekemianus									1				**1**
Lymnaeidae			1										**1**
Maccaffertium	7	7	7	27	5	1	1	7	11		3	9	**85**
Maccaffertium modestum						1				5			**6**
Maccaffertium pulchellum						1		1					**2**
Macronychus		1	1	2	3	3	3	1	3		3	1	**21**
Microtendipes pedellus-grp.	100	118	86	140	70	69	40	56	84		27	52	**842**
Naididae	1	2					1	2	1	34	3		**44**
Nais	5	22	14	12	27	19	21	21	12		14	27	**194**
Nanocladius	4					1			3	21			**29**
Nectopsyche					1								**1**
Nematoda			1			1						1	**3**
Nigronia												1	**1**
Nilotanypus fimbriatus			2										**2**
Nilothauma		2											**2**
Ophiogomphus	2												**2**
Optioservus		4	5		1		1						**11**
Orthocladius		2				3	5	2	3		3	4	**22**
Orthocladius lignicola	2												**2**
Pagastia		2		6			2	1					**11**
Parametriocnemus			2						1			1	**4**
Paratanytarsus		6	2	2					3	1		1	**15**
Paratendipes				2									**2**
Perlesta					1								**1**
Phaenopsectra	8	10	6	8	4	5	6	1	7		4	1	**60**

Sampling Location T-134													
Organism Description	Sample location along Transect												
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**Total**
Planaridae		1		2					1	1			**5**
Plauditus				2									**2**
Plauditus gloveri		1						2				2	**5**
Plauditus punctiventris		3										1	**4**
Polycentropodidae					1								**1**
Polypedilum	4	2		2									**8**
Polypedilum aviceps			4	2		2	1		3	1	3		**16**
Polypedilum fallax grp.						2				1		1	**4**
Polypedilum flavum							1	5					**6**
Polypedilum halterale grp.					2						1		**3**
Polypedilum scalaenum grp.		16	20		2	4			3	2	5	3	**55**
Pristina				2									**2**
Procloeon rivulare		1						1					**2**
Psephenus	2	2	1								1		**6**
Psychomyiidae	1												**1**
Rhagovelia			1										**1**
Rheotanytarsus			6	2	4	2	2		5	7	1	3	**32**
Rhyacophila											1		**1**
Serratella				1									**1**
Sialis		1									1	1	**3**
Sperchon					1								**1**
Sphaeriidae			1										**1**
Sphaerium											1		**1**
Stenacron				1			1						**2**
Stenelmis	18	15	17	13	7	6	6	8	8	3	5	8	**114**
Stenochironomus										8			**8**
Stylogomphus			1	1									**2**
Tanytarsus		6	12	6	4	3	4	3	10	1	2	5	**56**
Thienemanniella			2		2	2		1					**7**
Thienemannimyia/Arctopelopia group	4	16	8	6	8	5	1	2	8		3	2	**63**
Tricorythodes	6	8	3	6	4	6	2	6	7		1	6	**55**
Tubificidae		2							2	2			**6**
Tvetenia			2		6			1	1	2	1		**13**
Tvetenia vitraces				2		6				2			**10**
Abundance	**294**	**433**	**433**	**523**	**305**	**278**	**156**	**249**	**315**	**196**	**165**	**237**	**3584**

2007 Post-Remmediation Aquatic Assesment Monitoring
Macroinvertabrate Community Characterization
GE/Housatonic River Project
Pittsfield, Massachusetts

Sampling Location T-170													
Organism Description	Sample location along Transect												
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**Total**
Acentrella turbida	5	1	1	1	1			2		4			**15**
Ancylidae					3	5	1	1	1	3			**14**
Antocha	2	10	13	3	2	4	1	2	2	9	11	4	**63**
Baetidae	24		14	1	1			1			3		**44**
Baetis flavistriga	7	6	11	6	7	1	1	2		9	16	19	**85**
Baetis intercalaris	6												**6**
Baetis tricaudatus				1	1								**2**
Brachycentridae	1												**1**
Brachycentrus		3					1						**4**
Brillia									1	14		2	**17**
Caecidotea			1							1			**2**
Cambaridae		1	1							2			**4**
Cardiocladius										12			**12**
Ceraclea		1											**1**
Cheumatopsyche	124	151	133	74	110	34	12	70	73	133	44	28	**986**
Chimarra									1				**1**
Chironomus			2										**2**
Cladotanytarsus	4		2	4		2		2					**14**
Crangonyx	2			1									**3**
Cricotopus									15		5		**20**
Cricotopus bicinctus	24	10	24	16	14	6	2	26					**122**
Cricotopus trifascia	70	40	50	60	42	48	13	70	29	40	50	12	**524**
Cryptochironomus	2		2		2	2				2			**10**
Dicrotendipes			2					2	1	4	2		**11**
Enchytraeidae					3					1			**4**
Eukiefferiella	14	10	4	6	4	4		4		5			**51**
Eurylophella												1	**1**
Gyraulus	1								1				**2**
Hydropsyche	80	181	174	85	92	29	22	62	57	206	100	62	**1150**
Hydropsychidae	98	139	153	69	77	63	15	54	36	87	30	11	**832**
Hydroptila									1	1			**2**
Hydroptilidae								2					**2**
Leucotrichia									1				**1**
Leuctra										1			**1**
Limnephilidae			1										**1**
Limnodrilus	6	12	9	3	1				4		6	1	**42**
Limnodrilus hoffmeisteri	2		4		2								**8**
Limnophyes	2												**2**
Lymnaeidae	2		1		2	2	1					2	**10**
Maccaffertium		1	4	2	1	1			3	4	2	3	**21**
Microtendipes pedellus-grp.	30	20	48	24	14	16	3		12	8	13	16	**204**
Naididae			7				2		5				**14**
Nais	7	17	17	6	26	13	10	18	12	13	13	9	**161**
Nanocladius			2		2								**4**
Nematoda			1										**1**
Optioservus	24	7	19	6	19	9	5	5	3	6	9	4	**116**
Orthocladius	28	20	32	26	26	32	2	30	5	14	15		**230**
Parametriocnemus			4										**4**
Paratanytarsus	4												**4**
Perlesta								1		1			**2**
Perlidae		1	1										**2**
Phaenopsectra	10		4		2	4					2		**22**
Planaridae									1	1			**2**
Plauditus	6	2		1		2	3		11	3	4	1	**33**
Polypedilum		10	6										**16**
Polypedilum aviceps	8	20		6								9	**43**
Polypedilum bergi	2												**2**

Sampling Location T-170													
Organism Description	Sample location along Transect												
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**Total**
Polypedilum fallax grp.			2										**2**
Polypedilum flavum	4	20	6	6	16		9	4	8	16	9	6	**104**
Polypedilum halterale grp.	8			2		10	7	16			6	9	**58**
Potthastia									1				**1**
Rheotanytarsus			6		4			4	1			4	**19**
Simulium	2	1				1			1				**5**
Sperchon			1	1							1		**3**
Stenelmis	5	3	9	5	2	3	3	3	1	9	4	2	**49**
Stenochironomus					2								**2**
Sublettea coffmani		1											**1**
Tanytarsus			6	2									**8**
Thienemanniella			2	2		2		2					**8**
Thienemannimyia/Arctopelopia group			4		4			4	6	18		4	**40**
Tricorythodes							1		1	1	1		**4**
Tubificidae		7	6	2	1			4		1	1	1	**23**
Tvetenia	4												**4**
Tvetenia vitraces	20	30	32	18	12	2		4	3		10	4	**135**
Abundance	**638**	**725**	**821**	**439**	**495**	**295**	**114**	**395**	**297**	**629**	**357**	**214**	**5419**

APPENDIX C

BENTHIC MACROINVERTEBRATE PCB TISSUE DATA (2000)

2000 Post-Remmediation Aquatic Assesment Monitoring
Macroinvertabrate PCB Data
GE/Housatonic River Project
Pittsfield, Massachusetts

Location	Transect 134	Transect 134
Field Sample ID	H2-TW02CF01-0-0G17	H2-TW02CF02-0-0G18
Date	08/17/2000	08/18/2000
Sample Type		Duplicate
Analyte		
PCBS		
AROCLOR-1242 (ug/kg)	196.1 U	74.1 U
AROCLOR-1248 (ug/kg)	196.1 U	74.1 U
AROCLOR-1254 (ug/kg)	**24264**	**28156.9**
AROCLOR-1260 (ug/kg)	**461016.2**	**159556**
PCB, TOTAL by Aroclors (ug/kg)	**485280.2**	**187712.9**
PCB CONGENERS		
PCB-77 (ug/kg)	**2.697**	**0.009 J**
PCB-81 (ug/kg)	**0.174 J**	0.0741 U
PCB-126 (ug/kg)	**0.839 J**	0.0741 U
PCB-169 (ug/kg)	**0.061 J**	0.0741 U
PCB-105 (ug/kg)	**2158.579**	**798.741**
PCB-114 (ug/kg)	0.1961 U	0.0741 U
PCB-118 (ug/kg)	**3730.338**	**1704.029**
PCB-149/123 (ug/kg)	**34535.697**	**12302.133**
PCB-156 (ug/kg)	**2911.322**	**1377.477**
PCB-201/157/173 (ug/kg)	**2201.89**	**712.287**
PCB-167 (ug/kg)	**957.201**	**604.346**
PCB-189 (ug/kg)	**532.193**	**314.138**
PCB-1 (ug/kg)	0.1961 U	**2.801**
PCB-101/90 (ug/kg)	**13210.194**	**5937.015**
PCB-107 (ug/kg)	**305.425**	**115.441**
PCB-110 (ug/kg)	**7809.249**	**3206.484**
PCB-119 (ug/kg)	**122.704**	**92.214**
PCB-128 (ug/kg)	**2667.338**	**1375.316**
PCB-129 (ug/kg)	**726.644**	**341.288**
PCB-130 (ug/kg)	**373.5**	**141.623**
PCB-135 (ug/kg)	**7268.742**	**3077.118**
PCB-136 (ug/kg)	**3964.766**	**1478.954**
PCB-138/160 (ug/kg)	**37568.532**	**16108.839**
PCB-141/179 (ug/kg)	**16743.774**	**6013.452**
PCB-146 (ug/kg)	**5175.563**	**2539.55**
PCB-15 (ug/kg)	**191.406**	**197.368**
PCB-151 (ug/kg)	**13802.357**	**5147.062**
PCB-153/132 (ug/kg)	**57837.962**	**23030.047**
PCB-158 (ug/kg)	**4361.918**	**2238.928**
PCB-16/32 (ug/kg)	**51.95**	**34.423**
PCB-166 (ug/kg)	**22.111**	**8.728**
PCB-170/190 (ug/kg)	**18301.912**	**7358.208**
PCB-171/202 (ug/kg)	**6186.902**	**2731.67**
PCB-172 (ug/kg)	**3619.869**	**1574.917**
PCB-174 (ug/kg)	**23615.148**	**7876.274**
PCB-175 (ug/kg)	**1200.2**	**517.877**
PCB-176/137 (ug/kg)	**4416.145**	**1840.094**
PCB-177 (ug/kg)	**10038.023**	**4074.358**
PCB-178 (ug/kg)	**4546.345**	**1695.913**
PCB-18/17 (ug/kg)	**77.207**	**48.013**
PCB-180 (ug/kg)	**53269.303**	**19735.893**
PCB-183 (ug/kg)	**12294.146**	**5359.093**
PCB-185 (ug/kg)	**4095.738**	**1546.495**
PCB-187 (ug/kg)	**31756.383**	**10426.747**
PCB-191 (ug/kg)	**1008.413**	**487.747**
PCB-193 (ug/kg)	**2947.877**	**1183.528**
PCB-194 (ug/kg)	**12651.993**	**4370.14**
PCB-195/208 (ug/kg)	**6014.472**	**2137.873**
PCB-197 (ug/kg)	**366.007**	**116.343**

Location	Transect 134	Transect 134
Field Sample ID	H2-TW02CF01-0-0G17	H2-TW02CF02-0-0G18
Date	08/17/2000	08/18/2000
Sample Type		Duplicate
Analyte		
PCB-199 (ug/kg)	**13455.52**	**4115.712**
PCB-200 (ug/kg)	**2114.34**	**666.889**
PCB-203/196 (ug/kg)	**16006.502**	**5622.383**
PCB-205 (ug/kg)	**630.115**	**230.775**
PCB-206 (ug/kg)	**3343.376**	**850.188**
PCB-207 (ug/kg)	**565.351**	**115.551**
PCB-209 (ug/kg)	**62.075**	**15.914**
PCB-22/51 (ug/kg)	**32.461**	**10.861**
PCB-24/27 (ug/kg)	**56.045**	**69.833**
PCB-25 (ug/kg)	**52.266**	**60.868**
PCB-26 (ug/kg)	**85.903**	**90.459**
PCB-28 (ug/kg)	**158.945**	**67.736**
PCB-29 (ug/kg)	**12.452**	**12.194**
PCB-30 (ug/kg)	0.1961 U	**2.199**
PCB-31 (ug/kg)	**149.806**	**61.911**
PCB-33/20 (ug/kg)	**45.123**	**17.76**
PCB-39 (ug/kg)	0.1961 U	0.0741 U
PCB-40 (ug/kg)	**80.19**	**12.978**
PCB-41/64 (ug/kg)	**792.092**	**286.816**
PCB-42/59/37 (ug/kg)	**204.197**	**96.614**
PCB-44 (ug/kg)	**986.738**	**382.704**
PCB-45 (ug/kg)	**38.965**	**9.49**
PCB-46 (ug/kg)	**27.66**	**16.782**
PCB-47/75 (ug/kg)	**954.624**	**802.185**
PCB-48 (ug/kg)	0.1961 U	0.0741 U
PCB-49 (ug/kg)	**1263.436**	**875.896**
PCB-52 (ug/kg)	**2643.074**	**1229.55**
PCB-53 (ug/kg)	**139.508**	**110.494**
PCB-56/60 (ug/kg)	**853.95**	**129.166**
PCB-63 (ug/kg)	0.1961 U	0.0741 U
PCB-66 (ug/kg)	**348.548**	**114.157**
PCB-67 (ug/kg)	**87.36**	**82.942**
PCB-69 (ug/kg)	**11.411**	**15.08**
PCB-7/9 (ug/kg)	**3.713**	**4.624**
PCB-70 (ug/kg)	**2206.876**	**798.779**
PCB-72 (ug/kg)	**19.692**	**19.95**
PCB-74/61 (ug/kg)	**744.516**	**302.492**
PCB-8/5 (ug/kg)	**12.334**	**12.178**
PCB-82 (ug/kg)	**609.886**	**143.062**
PCB-83 (ug/kg)	**229.4**	**85.905**
PCB-84 (ug/kg)	**1386.973**	**481.862**
PCB-85 (ug/kg)	**841.799**	**350.41**
PCB-87/115 (ug/kg)	**2992.379**	**1159.781**
PCB-91/55 (ug/kg)	**948.425**	**487.752**
PCB-92 (ug/kg)	**1962.705**	**869.7**
PCB-95/80 (ug/kg)	**8621.006**	**3156.24**
PCB-97 (ug/kg)	**1647.657**	**588.219**
PCB-99 (ug/kg)	**2082.022**	**1027.928**
TOTAL DCB (ug/kg)	**62.075**	**15.914**
TOTAL DICB (ug/kg)	**207.453**	**214.17**
TOTAL HPCB (ug/kg)	**177828.597**	**66722.952**
TOTAL HXCB (ug/kg)	**188917.488**	**75784.861**
TOTAL MCB (ug/kg)	196.1 U	**2.801**
TOTAL NCB (ug/kg)	**3908.727**	**965.739**
TOTAL OCB (ug/kg)	**53440.839**	**17972.402**
TOTAL PECB (ug/kg)	**47713.852**	**19717.04**
TOTAL TCB (ug/kg)	**12351.436**	**5773.827**
TOTAL TRICB (ug/kg)	**722.158**	**476.257**
PCB, TOTAL by Congeners(ug/kg)	**485152.625**	**187645.963**
ORGANIC		
PERCENT LIPIDS (GC) (%)	**1.7**	**2.7**

U- non detect
J- estimated value

APPENDIX D

BENTHIC MACROINVERTEBRATE PCB TISSUE DATA (2007)

2007 Post-Remmediation Aquatic Assesment Monitoring
Macroinvertabrate PCB Data
GE/Housatonic River Project
Pittsfield, Massachusetts

Location	Transect 70	Transect 170	Transect 134	Transect 134
Field Sample ID	H2-TMI00070-0-C001	H2-TMI00170-0-C001	H2-TMI00134-0-C001	H2-TMI00134-1-C001
Date	06/26/2007	06/25/2007	06/26/2007	06/26/2007
Sample Type				Duplicate
Analyte				
PCBS				
AROCLOR-1242 (ug/kg)	27.17 U	27.17 U	27.17 U	27.17 U
AROCLOR-1248 (ug/kg)	**263.5**	**211.8**	**464.8**	**508.3**
AROCLOR-1254 (ug/kg)	**474.2**	**317.7**	**697.1**	**762.5**
AROCLOR-1260 (ug/kg)	**316.1**	**176.5**	**387.3**	**423.6**
PCB, TOTAL by Aroclors (ug/kg)	**1053.8**	**706**	**1549.2**	**1694.4**
PCB CONGENERS				
PCB-77 (ug/kg)	**0.239**	**0.128**	**0.248**	**0.318**
PCB-126 (ug/kg)	**0.144 J**	**0.055 J**	**0.096 J**	**0.133**
PCB-169 (ug/kg)	**0.161 J**	**0.044 J**	**0.031 J**	**0.026 J**
PCB-105 (ug/kg)	**17.582**	**10.652**	**17.656**	**18.509**
PCB-114 (ug/kg)	0.03 U	0.03 U	0.03 U	0.03 U
PCB-118 (ug/kg)	**56.916**	**36.177**	**58.399**	**70.347**
PCB-149/123 (ug/kg)	**13.56**	**18.336**	**46.512**	**42.207**
PCB-156 (ug/kg)	**15.713**	**7.219**	**15.704**	**19.625**
PCB-201/157/173 (ug/kg)	**1.394**	**1.071**	**2.425**	**2.736**
PCB-167 (ug/kg)	**6.833**	**3.247**	**6.219**	**7.447**
PCB-189 (ug/kg)	**0.636**	**0.225**	**1.552**	**1.205**
PCB-1 (ug/kg)	**18.328**	**9.199**	**12.447**	**12.523**
PCB-101/90 (ug/kg)	**62.243**	**36.647**	**95.207**	**111.955**
PCB-107 (ug/kg)	**14.156**	**3.619**	**9.264**	**9.210**
PCB-110 (ug/kg)	**23.928**	**30.908**	**60.558**	**58.579**
PCB-119 (ug/kg)	**4.565**	**3.386**	**7.52**	**7.837**
PCB-128 (ug/kg)	**10.778**	**7.044**	**12.309**	**15.774**
PCB-129 (ug/kg)	**4.475**	**1.652**	**3.377**	**4.187**
PCB-130 (ug/kg)	**0.220**	**1.607**	**3.988**	**3.993**
PCB-135 (ug/kg)	**2.027**	**5.12**	**14.763**	**13.749**
PCB-136 (ug/kg)	**0.283**	**0.313**	**4.095**	**6.590**
PCB-138/160 (ug/kg)	**84.035**	**49.552**	**100.233**	**119.384**
PCB-141/179 (ug/kg)	**15.484**	**11.885**	**32.122**	**31.326**
PCB-146 (ug/kg)	**29.339**	**9.366**	**27.994**	**27.762**
PCB-15 (ug/kg)	**13.225**	**11.123**	**23.577**	**28.481**
PCB-151 (ug/kg)	**16.130**	**7.546**	**20.590**	**20.414**
PCB-153/132 (ug/kg)	**122.090**	**71.253**	**149.305**	**177.647**
PCB-158 (ug/kg)	**11.228**	**8.040**	**14.926**	**17.146**
PCB-16/32 (ug/kg)	**5.583**	**2.544**	**4.914**	**6.189**
PCB-166 (ug/kg)	**0.965**	**0.232**	**0.482**	**0.580**
PCB-170 (ug/kg)	**28.566**	**14.784**	**31.820**	**37.878**
PCB-171/202 (ug/kg)	**3.874**	**1.991**	**5.580**	**5.235**
PCB-172 (ug/kg)	**3.571**	**2.204**	**6.023**	**6.144**
PCB-174 (ug/kg)	**8.104**	**5.155**	**13.274**	**11.662**
PCB-175 (ug/kg)	**2.755**	**0.685**	**1.622**	**1.398**
PCB-176/137 (ug/kg)	**5.738**	**1.939**	**3.797**	**3.573**
PCB-177 (ug/kg)	**6.379**	**3.416**	**9.333**	**9.755**
PCB-178 (ug/kg)	**5.252**	**1.603**	**6.714**	**7.132**
PCB-18/17 (ug/kg)	**4.189**	**1.532**	**5.493**	**5.688**
PCB-180 (ug/kg)	**61.589**	**29.287**	**62.895**	**76.143**
PCB-183 (ug/kg)	**11.914**	**5.712**	**15.98**	**16.480**
PCB-185 (ug/kg)	**2.199**	**0.661**	**2.955**	**2.922**
PCB-187 (ug/kg)	**26.138**	**11.561**	**35.071**	**37.425**
PCB-191 (ug/kg)	**1.02**	**0.519**	**0.987**	**0.984**
PCB-193 (ug/kg)	**3.193**	**1.477**	**3.637**	**4.396**
PCB-194 (ug/kg)	**9.557**	**4.058**	**10.421**	**13.353**
PCB-195/208 (ug/kg)	**2.041**	**1.199**	**3.743**	**4.054**
PCB-197 (ug/kg)	**0.083**	**0.080**	**0.240**	**0.2665**
PCB-199 (ug/kg)	**0.954**	**1.962**	**4.783**	**4.039**

Location	Transect 70	Transect 170	Transect 134	Transect 134
Field Sample ID	H2-TMI00070-0-C001	H2-TMI00170-0-C001	H2-TMI00134-0-C001	H2-TMI00134-1-C001
Date	06/26/2007	06/25/2007	06/26/2007	06/26/2007
Sample Type				Duplicate
Analyte				
PCB-200 (ug/kg)	**0.203**	**0.098**	**0.430**	**0.356**
PCB-203/196 (ug/kg)	**6.732**	**3.393**	**10.101**	**12.719**
PCB-205 (ug/kg)	**0.474**	**0.311**	**0.961**	**1.007**
PCB-206 (ug/kg)	**1.103**	**0.241**	**1.130**	**1.004**
PCB-207 (ug/kg)	**0.127**	**0.154**	**0.276**	**0.241**
PCB-209 (ug/kg)	**0.128**	**0.081**	**0.142**	**0.171**
PCB-22/51 (ug/kg)	**2.400**	**6.605**	**9.869**	**11.463**
PCB-24/27 (ug/kg)	0.03 U	**2.945**	**7.201**	**9.362**
PCB-25 (ug/kg)	**4.853**	**2.514**	**7.460**	**6.298**
PCB-26 (ug/kg)	**2.628**	**2.277**	**8.171**	**8.788**
PCB-28 (ug/kg)	**7.674**	**3.884**	**5.085**	**5.917**
PCB-29 (ug/kg)	**2.271**	**1.292**	0.03 U	**1.656**
PCB-30 (ug/kg)	**1.255**	0.03 U	0.03 U	0.03 U
PCB-31 (ug/kg)	**5.022**	**2.583**	**5.331**	**5.192**
PCB-33/20 (ug/kg)	**1.559**	**0.455**	**0.483**	0.03 U
PCB-39 (ug/kg)	**1.844**	**0.261**	0.03 U	0.03 U
PCB-40 (ug/kg)	**1.027**	**0.194**	**0.579**	**0.538**
PCB-41/64 (ug/kg)	0.03 U	0.03 U	0.03 U	0.03 U
PCB-42/59/37 (ug/kg)	**0.257**	**4.335**	**6.68**	**6.335**
PCB-44 (ug/kg)	**6.86**	**9.213**	**20.210**	**19.237**
PCB-45 (ug/kg)	0.03 U	**1.001**	0.03 U	0.03 U
PCB-46 (ug/kg)	**6.453**	0.03 U	0.03 U	0.03 U
PCB-47/75 (ug/kg)	**42.607**	**37.665**	**72.639**	**85.320**
PCB-48 (ug/kg)	**1.894**	**2.543**	**4.018**	**4.527**
PCB-49 (ug/kg)	**24.787**	**25.376**	**62.168**	**60.263**
PCB-52 (ug/kg)	**29.660**	**23.594**	**63.315**	**75.933**
PCB-53 (ug/kg)	**2.791**	**3.732**	**13.431**	**12.549**
PCB-56/60 (ug/kg)	**10.182**	**3.283**	**4.889**	**5.224**
PCB-63 (ug/kg)	**0.998**	0.03 U	0.03 U	0.03 U
PCB-66 (ug/kg)	**5.986**	**4.821**	**10.010**	**10.612**
PCB-67 (ug/kg)	0.03 U	**3.077**	**9.851**	**9.082**
PCB-69 (ug/kg)	0.03 U	0.03 U	0.03 U	0.03 U
PCB-7/9 (ug/kg)	0.03 U	**0.201**	0.03 U	**0.708**
PCB-70 (ug/kg)	**13.739**	**14.293**	**21.805**	**27.607**
PCB-72 (ug/kg)	0.03 U	**1.511**	**3.608**	**2.710**
PCB-74/61 (ug/kg)	**8.089**	**5.156**	**8.728**	**11.641**
PCB-8/5 (ug/kg)	**8.993**	**3.808**	**3.435**	**3.202**
PCB-82 (ug/kg)	**9.737**	**2.649**	**6.098**	**6.369**
PCB-83 (ug/kg)	**0.545**	**1.544**	**4.566**	**5.077**
PCB-84 (ug/kg)	**9.418**	**5.232**	**14.172**	**11.456**
PCB-85 (ug/kg)	**20.934**	**8.168**	**13.916**	**14.615**
PCB-87/115 (ug/kg)	**13.488**	**14.358**	**28.130**	**25.654**
PCB-91/55 (ug/kg)	**2.990**	**6.306**	**18.012**	**19.418**
PCB-92 (ug/kg)	**0.818**	**7.916**	**24.221**	**24.149**
PCB-95/80 (ug/kg)	**21.747**	**17.565**	**39.629**	**41.992**
PCB-97 (ug/kg)	**5.989**	**9.453**	**20.060**	**17.177**
PCB-99 (ug/kg)	**26.113**	**23.840**	**47.5**	**47.438**
TOTAL DCB (ug/kg)	**0.1 J**	**0.1**	**0.1 J**	**0.2 J**
TOTAL DICB (ug/kg)	**22.2 J**	**15.1**	**27 J**	**32.4**
TOTAL HPCB (ug/kg)	**170.9**	**81.2**	**201.2**	**222.3**
TOTAL HXCB (ug/kg)	**333.2**	**202.4**	**452.6**	**504.8**
TOTAL MCB (ug/kg)	**18.3 J**	**9.2**	**12.4 J**	**12.5 J**
TOTAL NCB (ug/kg)	**1.2 J**	**0.4**	**1.4 J**	**1.2 J**
TOTAL OCB (ug/kg)	**21.4 J**	**12.2**	**33.1**	**38.5**
TOTAL PECB (ug/kg)	**288.6**	**212.3**	**447.3**	**470.8**
TOTAL TCB (ug/kg)	**39.3 J**	**148.1**	**326.4**	**357.1**
TOTAL TRICB (ug/kg)	**164.3**	**26.9**	**54**	**60.6**
PCB, TOTAL by Congeners(ug/kg)	**1059.5**	**707.9**	**1555.5**	**1700.4**
ORGANIC				
PERCENT LIPIDS (OTHER) (%)	**1.5**	**1.1**	**2.4**	**2.4**

U- non detect
J- estimated value